3-161765

SPECIFICATION

1. Title of the Invention

    REMOTE CONTROLLER

2. Claims

    1.   A remote controller that is connected to plural terminal equipment using consumable supplies via a elecommunication line, receives plural information including use information related to the quantity of the used consumable supplies from each terminal equipment and selectively displays the received information on the display screen to execute processing for controlling each terminal equipment, comprising:

        storage means that stores the use information every terminal equipment; and

        display control means that instructs the stored use information to be displayed on the display screen, relating to the used quantity.

    2.   A remote controller according to Claim 1, further comprising:

        means that generates estimated use information related to the quantity of the used consumable supplies of each terminal equipment after a predetermined period based upon the use information, wherein:

1

the display control means instructs the generated estimated use information to be displayed on the display screen.

3. A remote controller according to Claim 1 or 2, further comprising:

initializing means that initializes use information stored in the storage means when the consumable supplies are supplied or replaced based upon the use information.

4. A remote controller according to Claim 1, 2 or 3, wherein:

said terminal equipment is an image formation device that forms an image on paper.

5. A remote controller according to Claim 1, 2 or 3, wherein:

said terminal equipment is a vending machine that automatically merchandises in exchange for money.

3. Detailed Description of the Invention

[Industrial field of Application]

The present invention relates to a remote controller that controls terminal equipment requiring field service such as a copying machine and a vending machine in a distant place using a telecommunication line.

[Prior Art]

An image formation device such as a copying machine requires regular maintenance because of the contamination of

the inside by the deterioration of photosensitive material, the scattering and the adhesion of toner and requires so-called field service. As for a copying machine, in addition to regular maintenance, when a failure or abnormality such as the failure of an image by noise such as blackening due to paper jam, the deterioration of photosensitive material and others occurs, the user makes a telephone call to a service company and the service company sends a service man for maintenance. Normally, a service company specializing in the maintenance performs the maintenance of a copying machine and manages the charge for copy.

Facilities such as a vending machine for merchandising a beverage, tobacco and others, air conditioning facilities and a refrigerating showcase also require field service as the copying machine and similarly, a manufacturer or a service company manages the facilities. Particularly, some vendors specializing in vending machines manage merchandise and facilities, in that case, a service man daily makes the rounds of facilities, manages merchandise, consumable supplies and collects money. A service company is required to manage facilities requiring field service as terminal equipment and to promptly take measures against the abnormality.

Prior art in which a center system collectively manages terminal equipment is disclosed in JP-A-60-263163. The determination of whether a copying machine is abnormal or not

3

and the operation to check the quality of the machine are enabled by connecting plural copying machines and a data summing device by a bidirectional signal. In this case, user data such as the number of copies and the quantity of used toner and service data such as the contamination of an optical system, the frequency of paper jam and the variation of the voltage are collected.

[Problems that the Invention is to Solve]

However, in the above-mentioned application, the display of information such as the number of copies and the quantity of used toner is not disclosed concretely, in case the information is displayed as it is, the degree of emergency of whether the replacement of parts and supply are required or not cannot be discriminated, the used quantity of all terminal equipment is required to be checked to check the degree of emergency and in case many terminal equipment are connected, there is a problem that it takes much time to check the degree of emergency. Time for a part to be replaced and time for consumable supplies to be supplied cannot be determined by only the used quantity when data is received, and the shortage of parts and the shortage of merchandise may occur.

The invention is made in view of such a situation and the object is to provide a remote controller wherein the information of use higher in the degree of emergency can be notified in order by displaying the information of use related

4

to the quantity of used consumable supplies on a display screen, the demand of consumable supplies can be promptly estimated by estimating used quantity after a predetermined period and the shortage of consumable supplies such as a part and merchandise on the side of a user can be prevented.

[Means for Solving the Problems]

The remote controller according to the invention is based upon a remote controller that is connected to plural terminal equipment using consumable supplies via a telecommunication line, receives plural information including the information of use related to the quantity of used consumable supplies from each terminal equipment, selectively displays the received information on a display screen and controls each terminal equipment and is characterized in that storage means that stores the information of use every terminal equipment and display control means that instructs the stored information of use to be displayed on the display screen in relation to the used quantity are provided, means for generating the information of estimated use related to the quantity of used consumable supplies of each terminal equipment after a predetermined period based upon the information of use is further provided, the display control means instructs the generated information of estimated use to be displayed on the display screen and when the consumable supplies are supplied or replaced based upon the information of use, the information

5

of use stored in the storage means is initialized.

[Action]

In the invention, when the information of use related to the used quantity of consumable supplies such as the number of copies is sent from terminal equipment, it is stored in the storage means and at required timing, the used quantity is displayed on the display screen in order more in the used quantity for example. The information of estimated use related to the used quantity after a predetermined period is generated based upon the information of use and is displayed. Further, the information of consumable supplies replaced or supplied based upon the information of use is initialized in the replacement or supply.

[Mode for Carrying out the Invention]

Referring to the drawings showing its embodiments, the invention will be described in detail below.

FIG. 1 is a schematic block diagram showing the configuration of a centralized control system using a remote controller according to the invention. As shown in FIG. 1, a reference numeral 1 denotes a copying machine as terminal equipment and for terminal equipment, in addition to a copying machine, all facilities requiring field service including an image formation device such as a laser printer, a vending machine, air conditioning facilities and a refrigerating showcase are conceivable. In the copying machine 1, an

interface circuit 2 is provided.

The interface circuit 2 functions as an interface between the copying machine 1 and a communication unit 3 and is connected to the communication unit 3 via a transmission line 5. For a format of data flowing on the transmission line 5 and a control system, various modes such as a serial mode and a parallel mode and various systems such as a contention control system can be used. The communication unit 3 executes processing such as the identification and the control of the copying machine 1, sending and receiving data to/from the copying machine 1, the temporary storage of data from the copying machine 1, the control of the situation of the copying machine 1, the generation of data to be transmitted to a center system 4 described later, sending and receiving data to/from the center system 4 and the control of the timing of calling the center system 4.

The center system 4 is connected to the communication unit 3 via a telecommunication line 6 such as a public telephone line, a common carrier leased line and a private circuit including a local area network (LAN), receives data transmitted from the copying machine 1 via the communication unit 3, executes application software for controlling the copying machine 1 and sends/receives data to/from the communication unit 3.

In this embodiment, the communication unit 3 is installed

outside the copying machine 1, however, the communication unit
may be also provided inside the copying machine 1. To lower
the price of the communication unit 3, a communication unit
wherein only a call from the communication unit 3 is enabled
is used, however, a communication unit that can receive a call
from the center system 4 may be also used.

FIG. 2 is a block diagram showing the configuration of
the interface circuit, as shown in FIG. 2, a reference numeral
7 denotes a sensor for acquiring required data in the copying
machine 1 such as the voltage, the current, the temperature,
the state and the number of copies, data acquired from the
sensor 7 is sent to an A/D converter 8 in case the data is an
analog value and is converted to a digital value. In case the
copying machine 1 itself stores data such as the number of
copies, the data showing the number of copies is sent to a data
receiver 9 instead of the A/D converter 8. In place of the
A/D converter 8, a level converter that converts the level of
data may be also used. The data acquired by the A/D converter
8 or the data receiver 9 is temporarily stored in a buffer 10
and is sent to the communication unit 3 via a data
transmitter-receiver 11 at the request of the copying machine
1 for transmission or at the request of the communication unit
3. The sensors 7, the A/D converters 8, the data receiver 9,
the buffer 10 and the data transmitter-receiver 11 are
controlled by a control unit 12 and the timing control of each

data is executed. Required power is supplied to the interface circuit 2 from a power source 13. Instead of the power source 13, a power source in the copying machine 1 may be also used.

FIG. 3 is a block diagram showing the configuration of the communication unit and data sent to the communication unit 3 via the transmission line 5 is temporarily stored in a buffer 15 via a data transmitter-receiver 14. The data stored in the buffer 15 is sent to a central control unit 16 using a microprocessor for example and primary processing described later is executed there.

The line number of a preset data sending destination (for example, the center system 4) is sent to a network control unit (NCU) 20 from the central control unit 16, NCU connects the telecommunication line 6 having the line number and data is sent/received via a modem 19 and the telecommunication line 6. A memory 17 that stores a program for controlling the communication unit 3, time data for a report at fixed time and data such as a line number sent to NCU 20, an input device 30 that reports the time of replacement and the time of a communication test to the central control unit 16 and a timing device 18 are connected to the central control unit 16. A power source 21 for supplying power to the communication unit 3 is provided.

The central control unit 16 is operated according to a program installed beforehand and a command from the center

system 4, normally sends/receives data to/from the copying machine 1 via the data transmitter/receiver 14 and the buffer 15, analyzes the data and monitors the copying machine 1. In case abnormal data is sent from the copying machine 1 and in case time stored in the memory 17 and the time of the timing device 18 are coincident, the central control unit 16 sends the number of a set data sending destination to NCU 20 to connect the telecommunication line 6 and sends/receives data to/from the center system 4 via the modem 19 and the telecommunication line 6.

FIG. 4 is a block diagram showing the configuration of the center system which is a remote controller according to the invention, the center system 4 uses a personal computer or an office computer for example, and a modem 22 that sends/receives data to/from the telecommunication line 6, a storage 24 including ROM, RAM and an auxiliary storage that stores data and a program, a monitor 25 that displays an image and data, a printer 26 that prints a required item, a keyboard 27 for inputting data and a mouse 28 for specifying a position on the monitor 25 are connected to a central processor 23. Data sent to the central processor 23 is sent to a send/receive processor 231, a text buffer 232, a received text processor 233 and a file storage 234 in that order as described later (see FIG. 8) and is processed there. Data in the file storage 234 is sent to a data display 236 according to a command for

the registration of data and the request of display from an input processor 235 and is processed so that the data can be displayed on the monitor 25.

Next, the function of the interface circuit 2, the communication unit 3 and the center system 4 will be described in detail.

The interface circuit 2 is provided with a function for providing data required to control the copying machine 1 to the center system 4 via the communication unit 3, and in the case of the copying machine 1, data collected by the interface circuit 2 includes the number of copies every size, the voltage of the main part such as exposure voltage and developing bias voltage, the temperature of the main part such as the temperature of a heat roller, paper jam every position, the shortage of toner (developer), the shortage of paper, failure information such as the abnormality of voltage, power on/off and the information of the copying machine during copying. The number of copies every size, the voltage and the temperature of the main part out of these data are measured every time the copying machine 1 is operated, are temporarily stored in the buffer 10 and are transferred via the data transmitter/receiver 11 in response to a request from the communication unit 3, however, the communication unit 3 can always monitor failure information and the information of the copying machine. When much data is transmitted via the transmission line 5, data may

11

be also transmitted by time division to reduce data quantity transmitted on the transmission line 5.

Table 1 shows an example of signals on the transmission line 5 between the interface circuit 2 and the communication unit 3, and an 8-bit data signal, a 4-bit select signal and a 4-bit status signal are sent between the interface circuit 2 and the communication unit 3.

Table 1

1. Signal name

2. Data flow between copying machine and communication unit

3. Contents

4. Data signal

5. Number of copies every size, measurement data, failure information corresponding to Select 0 to 3 are output

6. Select signal

7. Selects output data

8. Status signal

9. Shows occurrence of failure

10. Shows copying is enabled

11. Shows power supply is on

Table 2 shows an example of relationship between the state of the select signal and data, and data such as the number of copies every size , exposure voltage, developing bias voltage, the temperature of a heat roller and a failure mode is output in the form of an 8-bit data signal Data 0 to Data 7 according

12

to the setting or the reset (= 1, 0) of each bit S0 to S3 of the select signal.

Table 2

1. Contents

2. High-order 2 digits of number of A3-size copies

3. Low-order 2 digits of number of A3-size copies

4. High-order 2 digits of number of A4-size copies

5. Low-order 2 digits of number of A4-size copies

6. High-order 2 digits of number of B4-size copies

7. Low-order 2 digits of number of B4-size copies

8. High-order 2 digits of number of B5-size copies

9. Low-order 2 digits of number of B5-size copies

10. High-order 2 digits of exposure voltage

11. Low-order 2 digits of exposure voltage

12. High-order 2 digits of developing bias voltage

13. Low-order 2 digits of developing bias voltage

14. High-order 2 digits of temperature of heat roller

15. Low-order 2 digits of temperature of heat roller

16. Failure mode

17. Reserved

FIG. 5 shows an example of relation between the state of the select signal and the output timing of data, the control unit 12 of the interface circuit 2 collects the data of the copying machine 1, monitors the state of each bit S0 to S3 of the select signal from the communication unit 3 and always

13

outputs data according to the state of each bit S0 to S3 of the select signal in the form of data signals Data 0 to 7. In case a failure occurs in the copying machine 1, a trouble signal is immediately turned on and simultaneously, a failure mode number (a trouble code) showing the contents of the failure is set in a failure register not shown of the buffer 10 to prepare for a request (the select signal S3, S2, S1, S0 = 1110) for the failure mode number from the communication unit 3. During copying, a copy RDY signal is turned off and it is declared upon the communication unit 3 that for this while, measurement data detected by the sensors 7 is not guaranteed.

The communication unit 3 executes the primary processing of data sent from the copying machine 1, always monitoring the copying machine 1. The primary processing includes the management of the number of copies every size, the management of the voltage of the main part and the maximum value/the minimum value of temperature and the calculation of an average value. The on-off of the power source, copying operation and a situation of a failure are always monitored.

The communication unit 3 normally switches the select signal at timing when the copying machine 1 becomes ready (the copy RDY signal is turned on) while the power source is turned on and reads the number of copies every size and measurement data such as the voltage and the temperature of the main part.

When the trouble signal is set, the communication unit

14

switches the select signal, reads a failure mode number (a trouble code) and determines the contents of failure. The contents of failure are classified into predetermined levels (serious failure, intermediate failure, light failure and others) and in the case of serious failure, the communication unit immediately calls the center system 4 and notifies the copying machine 1 that a serious failure occurs. In the case of intermediate failure, when an intermediate failure occurs by predetermined times, the communication unit calls the center system 4 and in the case of light failure, the communication unit sends the data of the light failure in communication at fixed time.

When a power signal is turned off, the number of copies every size read till then is once stored in the memory 17 and in the case of a copying machine without a memory backup function, new read data is acquired by adding data after then and the stored data.

The communication unit 3 is provided with a function for transmitting the number of copies every size and the measurement data of the copying machine 1 to the center system 4 and for the timing of calling the center system 4, the following five types are set.

(1) Power on call: When the communication unit 3 is powered on

(2) Fixed time call: Fixed time (normally once a day)

15

(3) Call when a failure occurs: When a failure requiring a report occurs and when it is recovered

(4) Call when a part is replaced: When a service man replaces a part and instructs to call

(5) Communication test call: When a communication test switch is pressed

Normally only a predetermined center system 4 is called, however, in consideration of closure on a holiday and at midnight, in this embodiment, total three destinations of a call can be set. The destination of a call and the time of a fixed time call can be also changed according to an instruction from the center system 4.

In consideration of a case that a failure occurs while data is transmitted to the center system 4, precedence is given to the destinations of a call and the communication unit 3 transmits data in order in which the priority is higher. Next, each timing of a call will be described in detail.

The power on call is a call for matching with the sequence of the center system 4 when the power source of the communication unit 3 is turned on. The communication unit 3 receives a center system number, the time of the fixed time call and the current time from the center system 4 after the communication unit sends the current state of the copying machine 1 and writes them in the memory 17.

The fixed time call is a call for sending the data of the

copying machine 1 collected by the communication unit 3 at predetermined time or at time specified by communication from the center system 4. The communication unit 3 deletes the number of copies every size and measurement data in it after a fixed time call is finished and sets the contents in the memory 17 in case there is data to be returned.

The failure call is a call in case the occurrence of a failure is immediately reported to the center system 4 in case a serious failure occurs or an intermediate failure occurs by times requiring a report in the copying machine 1 and a call in case the troubles are recovered. In this case, a trouble code showing the contents of the failure is sent. When the failure is recovered, the recovery of the failure is also sent together with the trouble code.

The part replacement call is a call in case a service man reports the replacement of a part to the center system 4 in case he/she replaces the part such as a photoconductive drum, a developer tank and a waste toner bottle of the copying machine 1 requiring record.

The communication test call is a call at the time of a test required for the maintenance and the inspection of a system.

The part replacement call and the communication test call are started when a service man or an operator operates the input device 30 provided to the communication unit 3 independent of

traffic with the interface circuit 2.

The communication unit 3 transfers a number of the destination of a call the highest in priority to NCU 20 in case a condition of a call is met and requests the connection of the line. When the line is connected, the communication unit transmits data to the center system 4 via the modem 19. When the transmission is finished, the communication unit sends data to the destination of a call the second highest in priority and repeats the processing.

A procedure for communication between the communication unit 3 and the center system 4 has many methods, however, in this embodiment, no procedure in a contention mode according to JIS C6326 is adopted. In case the communication line is busy or in case an error or the disconnection of the line occurs during communication, resending is performed up to three times.

FIG. 6 shows an example of a telegraphic message including data sent from the communication unit 3 to the center system 4. The telegraphic message is sent in units of byte and a numeral in FIG. 6 shows a byte number. STX in a first byte denotes the head of data. A communication mode in a second byte shows the contents of a call and a power on call to a communication test call are allocated to numerals 1 to 5. "aA to aD" in 7th and 8th bytes, 25th and 26th bytes, 63th and 64th bytes and 70th and 71st bytes show the meaning of data in each block, aA show the number of copies, aB show measurement data,

aC show trouble information and aD show part replacement information. Data which succeed aA and aB and each of which is composed of 4 bytes are respectively the number of copies every size summed till then, the maximum value, the minimum value and the average value of each measurement data. A numeral of one byte which succeeds aC shows the occurrence/the recovery of trouble, in the case of the occurrence, '1' is on and in the case of the recovery, '0' is on. A field of 4 bytes which succeeds it shows a trouble code of trouble which occurs or is recovered. The contents of failure includes the abnormality of exposure voltage, developing bias voltage, the temperature of a heat roller, paper jam and a scanner. A field of 4 bytes which succeeds aD shows a part code in replacing parts by 4-digit numerals. aC and the trouble code, aD and a part code are respectively sent in case a communication mode is a failure occurrence call and in case a communication mode is a part replacement call and in the case of a communication mode except them, nothing is sent. ETX denotes the end of data.

In case an instruction is sent from the center system 4, instruction data is sent from the center system 4 after ETX is detected from the communication unit 3. FIG. 7 shows an example of a telegraphic message including instruction data sent from the center system to the communication unit. A code which the communication unit 3 sends is put in the field of a communication mode in a second byte as it is. A 15-digit

19

numeral which succeeds aA shows the number of the center system 4 and is also sent in case there is no change. Data which succeeds aS is data for specifying the time of a fixed time call of the communication unit 3 during communication, '0' is put as a code of a day of the week in case this specification is the same as last specification, '8' is put in the case of every day and in case sending at fixed time is not required, '9' is specified. In case sending at fixed time once a week is requested, a day of the week is specified by a numeral 1 to 7. The hour and the minute are respectively specified by 2 digits according to the notation of 24 hours. Data which succeeds aT is data showing the current time. As the current time may be different between the communication unit 3 and the center system 4, the center system 4 necessarily sends back these data to adjust time in case a communication mode is a power on call. The remote maintenance of the copying machine 1 can be executed and failure diagnosis information can be also sent to a service man by adding au, av and others as the send-back data and sending a terminal control code.

Next, the center system 4 will be described in detail.

The center system 4 is provided in a field service company and is provided with functions such as the control of a line and transmission respectively related to data sent via the telecommunication line 6 by a call from each communication unit 3, the storage of the data in the memory and an update process,

various display processes and display based upon the stored

data, the registration of the information of a user having the

communication unit 3 and the copying machine 1, a registration

process of data of a used type and a used part and input-output

control. FIG. 8 is a block diagram showing the configuration

of a central processing unit of the center system 4. A

send/receive processor 231 senses communication from the

communication unit 3 by an interrupt from the modem 22, controls

a line and transmission and stores a received text such as

measurement data from the modem 22 in a received text buffer

232. A received text processor 233 checks the contents of the

received text buffer 232 in main processing, analyzes the

contents in case a received text is stored and stores the data

in a file storage 234. A data display 236 which is display

control means reads the contents of the received text stored

in the file storage 234 according to the registration of data

and a request for display, processes according to the object

and displays the data on a monitor 25.

The send/receive processor 231 monitors the state of the

modem 22, checks for an error of received data, sends ACK or

NAK according to the check, executes sequence control, sends

downloaded data and stores the received text in the received

text buffer 232.

The received text processor 233 executes received data

preparation and a received data update process. For the

21

received data preparation, the format check of a text is performed after the occurrence of the received text is verified and the data is passed to the next device if the data includes no error. For the received data update process, data required for update is extracted from data from the front device and after update date data, the data of the number of copies, trouble data, measurement data and part replacement data are converted to a format corresponding to a record of a file, they are written to a file.

The received text processor 233 is provided with a buffer for storing four lists of a list of parts requiring replacement, a failure list, a duty cycle list and an estimate list, a code (number) of terminal equipment having a part requiring replacement is stored in the list of parts requiring replacement and a code (number) of terminal equipment which currently fails is stored in the failure list. The duty cycle is calculated based upon received data, and the duty cycle list and the estimate list are sorted in order higher in the duty cycle.

The data display 236 processes data so that the screen composed of the following twelve types of display screens is displayed on the monitor 25 according to input by an operator via the keyboard 27 or an instruction to display data by the operation of the mouse 28. FIG. 9 shows the contents of display on the data display. When the occurrence of trouble is

received even if any screen is displayed, it is immediately displayed on the screen that trouble occurs. In case a menu screen is displayed, the replacement of parts is also announced.

a. MENU DISPLAY: Contents of processing are selected

b. PPC SELECTION: Terminal equipment which displays state of PPC is selected

c. REPLACED TIME ANNOUNCEMENT: Duty cycle of part is displayed

d. COPY CHARGE DISPLAY: Charge for copy is calculated and displayed

e. PPC STATE DISPLAY: Latest PPC state is displayed

f. PPC PERFORMANCE HISTORY DISPLAY: History of measurement data is displayed

g. PPC FAILURE HISTORY DISPLAY: Trouble history is displayed

h. PPC REPLACEMENT HISTORY DISPLAY: Part replacement history is displayed

i. PPC COPIES NUMBER DISPLAY: Number of copies every day and every size is displayed

j. USER REGISTRATION: Registration, change and deletion of user information

k. TYPE REGISTRATION: Registration, change and deletion of type information

l. TERMINAL REGISTRATION: Registration, change and

deletion of terminal information

On display screens b to i shown in a double frame out of these display screens, user information, type information and terminal information are further displayed. The mouse 28 can be used to instruct data display a to i for the convenience of an operator. That is, a cursor is moved to a part where each information is displayed by the mouse 28 and display can be instructed by clicking it. Instruction can be canceled by the mouse 28. However, data input j to k is required to be carefully performed using the keyboard 27.

Next, the detailed processing of each display contents will be described.

FIGs. 15 to 38 show the screen configuration processed by the data display of the monitor.

When the center system 4 is activated by power on and when each display screen continues to be returned, a menu is finally displayed as shown in FIG. 15. In this case, a menu including seven processes of "FAILURE RETRIEVAL", "PPC SELECTION", "REPLACED TIME ANNOUNCEMENT", "COPY CHARGE MANAGEMENT", "USER REGISTRATION", "TYPE REGISTRATION" and "TERMINAL REGISTRATION" is displayed, and processing is selected by selecting an icon using the mouse 28. In case terminal equipment which currently fails exists, an icon of "FAILURE RETRIEVAL" is flickered as shown in FIG. 16 to tell it. In case terminal equipment the part of which is required to be

24

replaced exists, an icon of "REPLACED TIME ANNOUNCEMENT" is flickered to tell it.

A PPC selection menu is displayed when "PPC SELECTION" is selected in menu display and when control is returned after "PPC STATE DISPLAY" is called out of the PPC selection menu. In this case, the terminal number of the copying machine 1, a user name and a type name are displayed as shown in FIG. 17 and a copying machine of a target is selected on the screen of PPC STATE DISPLAY. A copying machine which fails and a copying machine the part of which is required to be replaced are displayed as shown in FIGs. 18 and 19. Particularly, in case failure occurs, the occurrence of failure is also displayed in the lower part of the right side of the screen. As described above, terminal information, user information or type information can be displayed in a window as shown in FIG. 20 by moving the cursor shown by a hollow arrow to a field of terminal equipment, a user or a type in the upper part by the mouse 28 and clicking.

Replaced time is displayed when "REPLACED TIME ANNOUNCEMENT" is selected in menu display and when control is returned after "PPC STATE DISPLAY" is called. In this case, a copying machine where the duty cycle of a photoconductive drum, a developer tank and a waste toner bottle which are the replacement part of the copying machine is high is displayed in higher order as shown in FIG. 30. In this case, when an

25

estimate is selected, the screen where the next replaced day is estimated based upon the duty cycle up to the present and the number of copies can be displayed as shown in FIGs. 31 and 32.

When "COPY CHARGE MANAGEMENT" is selected in menu display, a copy charge is displayed, a copy charge for past one year is calculated every month and it is displayed every copying machine as shown in FIG. 34. A bill is issued based upon the contents of display. For settlement, the range of a calculated day of a copy charge every month is set, a copy charge is calculated as shown in FIG. 35 and a bill of the copy charge is printed.

The state of PPC is displayed as shown in FIG. 21 when "STATE MONITORING" is selected in PPC selection menu display or in replaced time announcement display, when "FAILURE RETRIEVAL" is selected in menu display during the occurrence of failure and when "RETURN" is selected in PPC performance history display, PPC replacement history display and the display of the number of copies of PPC respectively described later. In this case, the maximum value, the minimum value and the average value based upon measurement data such as the number of copies, the status of failure, exposure voltage, developing bias voltage and the temperature of a heat roller and the duty cycle of a replacement part such as a photoconductive drum, a developer tank and a waste toner bottle are displayed.

When the maximum value and the minimum value of measurement data exceed an optimum range, the measurement data is displayed in red. When the duty cycle of a replacement part exceeds 100%, the replacement part is displayed in red. For the order of the display of copying machines, copying machines which fail are sorted in the order of terminal numbers in a failure list and displayed when the failing copying machines are called from "FAILURE RETRIEVAL". Hereby, failure can be promptly retrieved. When copying machines which fail are called from "REPLACED TIME ANNOUNCEMENT", they are displayed in the order higher in the duty cycle out of all copying machines. Further, when copying machines which fail are called from "PPC SELECTION", they are displayed in the order of terminal numbers. In the meantime, in case abnormality occurs in a copying machine while "PPC STATE MONITORING" is displayed, a part where the failure occurs is displayed in the field of a failure status and information showing the occurrence of failure is displayed in the corner of the right side of the screen as shown in FIG. 33. In this case, a case that the temperature of a heat roller is abnormal and an error of fixing occurs is shown and the case of another failure such as the trouble of a scanner is also similarly displayed.

A PPC state history is displayed by selecting "MENU" in PPC state display to display a submenu as shown in FIG. 22 and selecting "PPC PERFORMANCE HISTORY". In this case, the

variation of the average value of exposure voltage, developing bias voltage and the temperature of a heat roller is displayed on a time base of week, month and year as shown in FIG. 23. The variation of the maximum value and the minimum value of measurement data showing the respective performance of these is displayed on the time base of week, month and year as shown in FIG. 24.

A PPC failure history is displayed by selecting "MENU" in PPC state selection to display the submenu shown in FIG. 22 and selecting "PPC FAILURE HISTORY". In this case, a month in which failure occurs, the contents of abnormality, exposure voltage, developing bias voltage, the temperature of a heat roller respectively at that time and received time are displayed as shown in FIG. 25. Items which exceed the optimum range in measurement data are displayed in red.

A PPC replacement history is displayed by displaying the submenu similarly and selecting "PPC REPLACEMENT HISTORY". In this case, a date when parts such as a photoconductive drum, a developer tank and a waste toner bottle are replaced and the duty cycle of the part at that time are displayed as shown in FIG. 26.

The number of copies of PPC is displayed by displaying the submenu similarly and selecting "NUMBER OF COPIES OF PPC". In this case, the variation of the number of copies every day and every size is displayed on the time base of week, month

and year as shown in FIGs. 27 to 29.

User registration is displayed when "USER REGISTRATION" is selected in menu display and in this case, user information such as a user name, his/her telephone number and address is registered, changed or deleted as shown in FIG. 36.

Type registration is displayed when "TYPE REGISTRATION" is selected in menu display and type information such as a type name, the optimum range of exposure voltage, developing bias voltage and the temperature of a heat roller, the replacement of a photoconductive drum, a developer tank and a waste toner bottle and the number of copies is registered, changed or deleted as shown in FIG. 37.

Terminal registration is displayed when "TERMINAL REGISTRATION" is selected in menu display and terminal information such as a terminal number, a type name, a serial number and a user name is registered, changed or deleted as shown in FIG. 38.

In the meantime, a numerical value displayed on the data display 236 is calculated according to the following operation.

Drum duty cycle = {(cumulative number of copies) − (cumulative number of copies in replacing drum)}/(number of copies in replacing drum) x 100(%)

The duty cycle of developer and a waste toner bottle is calculated as the duty cycle of a drum. Further, a charge for copy is calculated based upon a basic rate and a rate every

sheet for example.

The file storage 234 stores the following seven data files. A data file roughly includes terminal common information and terminal individual information and the terminal common information is equivalent to the following four files.

(1) PPC terminal information file

(2) PPC user information file

(3) PPC charge data file

(4) PPC type information file

The terminal individual information is equivalent to the following three files.

(1) PPC data file

(2) PPC part replacement history file

(3) PPC failure history file

The PPC terminal information file is a file for storing data registered, changed or deleted in terminal registration and in the file, correspondence among a terminal number, a type name, a serial number and a user name is managed. Records of this file are sorted in the order of terminal numbers. Sorting is performed in registration and the file is updated.

The PPC user information file is a file for storing data registered, changed or deleted in user registration and in the file, a user name, a zip code, an address and a telephone number are managed. Records of this file are sorted by a user name. Sorting is performed in registration and the file is updated.

30

The PPC charge data file manages the number of copies every size for one month and a charge for copy for one month of each copying machine.

The PPC type information file is a file for storing data registered, changed or deleted in type registration and manages the optimum range of the exposure voltage, the developing bias voltage and the temperature of a heat roller of each type, the replacement of a photoconductive drum, a developer tank and a waste toner bottle and the number of copies.

The PPC data file manages various data of the number of copies, exposure voltage, developing bias voltage, the temperature of a heat roller and a trouble state respectively sent from the communication unit 3. In this case, the file manages the data of fixed time calls for 365 (366) days from January 1st to December 31st and data sent lately is recorded in the file. Further, the final number of copies, the cumulative number of copies, the cumulative number of copies at the time of replacing photoconductive drums, the cumulative number of copies at the time of replacing developer tanks and the cumulative number of copies at the time of replacing waste toner bottles are recorded in the file.

The PPC part replacement history file manages a date and time when parts are replaced and the number of copies at the time of replacement.

The PPC failure history file manages a date and time when

failure occurs, exposure voltage, developing bias voltage and the temperature of a heat roller. This file is added every time failure occurs.

Next, the contents of processing by the center system 4 will be described.

FIG. 12 is a flowchart showing the contents of processing by the send/receive processor of the central processing unit. First, the state of the modem 22 is monitored, it is checked whether the modem receives a call in from the communication unit 3 or not (a step 101), in case the modem receives no call in, the processing is terminated and in case the modem receives a call in, a received data storage process for storing received data in the received text buffer 232 is executed (a step 103). Next, it is determined whether a receiving error occurs or not (a step 104). A receiving error is judged based upon a parity check and whether A, B, C and D respectively next to @ showing a data interval of the telegraphic message shown in FIG. 6 are normally received in the order or not. When a receiving error occurs, NAK sending processing for sending a NAK signal for instructing the communication unit 3 to send data again to the communication unit 3 is executed (a step 106) and when no receiving error occurs, ACK sending processing for sending an ACK signal showing that data is normally received to the communication unit 3 is executed (a step 105).

Next, at the time of adjusting time and others, it is

32

determined whether the directive data shown in FIG. 7 is transmitted or not, that is, whether there is data to be transmitted from the center system 4 to the communication unit 3 or not, in case there is data to be transmitted, data sending processing is executed (a step 107) and in case there is no data to be transmitted, the step 107 is skipped and it is determined whether the processing is normally finished or not (a step 108). In this case, it is determined whether the processing is normally finished or not based upon whether the line is disconnected during communication or not and others. In case the processing is normally finished, normal line disconnection operation for resetting an abnormal disconnection flag (not shown) is executed (a step 109) and in case the processing is not normally finished, an abnormal line disconnection process is executed (a step 110).

Next, it is verified by a predetermined flag that the line is actually disconnected (a step 111) and it is checked whether the received text buffer 232 has free space or not (a step 112). When the received text buffer 232 has no free space, a receive buffer wait process for prohibiting an automatic call in response is executed (a step 113) and the processing is terminated.

Next, referring to flowcharts shown in FIGs. 13A and 13B, the contents of processing by the received text processor 233 will be described. First, it is determined whether a received

33

text is stored in the received text buffer 232 or not (a step 201), in case it is stored, a received data extraction process for reading it is executed (a step 202), the format check of the received text is performed and it is determined whether an error occurs or not (a step 203). In case the received text has no error, its communication mode, its communication unit code and a date are set (a step 204) and the type of a call is determined in steps 205 to 209. In the case of a power on call, an initialization process for clearing a file for that day is executed (a step 210) and is terminated. In the case of a test call, test file receive data (not shown) is stored (a step 211) and the processing is terminated.

In the case of a fixed time call and a part replacement call, a copies number memory every terminal and every size is updated in a step 220 and the cumulative number of copies is calculated (a step 221). The above-described duty cycle of each part is calculated (a step 222) and it is determined whether the duty cycle exceeds 100% or not (a step 223). When the duty cycle exceeds 100%, the part is registered in a replacement requirement list of each part every terminal (a step 224).

Next, a duty cycle list of each part is made (a step 225) and an estimated list is made based upon the list (a step 226). The estimated list is made by estimating a use status of each replacement part after one week or one month based upon result

occurs, a terminal number and a terminal code are registered in the failure list (a step 242), the terminal code and a date are registered in a failure history file every terminal (a step 243) and the processing proceeds to the step 220.

Next, referring to flowcharts shown in FIGs. 14A to 14H, the contents of processing by the data display 236 will be described. First, an initialization process for clearing all memories such as video RAM (not shown) inside the data display is executed (a step 300) and a menu screen shown in FIG. 15 is displayed (a step 301). Next, it is determined whether a failure list exists or not, that is, whether a copying machine which currently fails exists or not (a step 302) and in case the failure list exists, a failure blinking process for blinking an icon for the retrieval of failure on the menu screen as shown in FIG. 16 is executed (a step 303). Next, it is determined whether a replacement requirement list exists or not, that is, whether a part the current duty cycle of which exceeds 100% exists or not (a step 304) and in case such a part exists, a replacement requirement blinking process for blinking an icon of replaced time announcement on the menu screen is executed (a step 305). It is determined in a step 306 whether input by clicking the mouse 28 is made or not and it is determined which menu is selected in the next steps 307 to 313.

When it is determined in the step 307 that failure

retrieval is selected, the processing proceeds to a step 450 shown in FIG. 14E, terminal numbers are sorted in the order of failure lists as shown in FIG. 33 and the processing proceeds to a step 334 described later.

When "PPC SELECTION" is selected in the step 308, the terminal list shown in FIG. 17 is displayed (a step 315), it is determined whether input by the mouse 28 is made or not (a step 316), in case no input by the mouse is made, it is determined in a step 317 whether a failure list exists or not, in case the failure list exists, terminal equipment which fails is displayed, being blinked as shown in FIG. 19 (a step 318) and control is returned to the step 316. In case no failure list exists, control is similarly returned to the step 316. An input and failure list detection process in the steps 316 to 318 is hereinafter called a process A.

In case it is determined in the step 316 that input is made, it is determined whether control is next returned or not, in case control is returned, control is returned to the step 301, when control is not returned, it is determined whether upward/downward scrolling is performed or not (a step 320), when the upward/downward scrolling is selected, an upward/downward scrolling process is executed in the step 314 and control is returned to the step 316. Next, the cursor is moved to user display by the mouse 28 in a step 321, it is checked whether the user display is selected or not, when the user

37

display is selected, the contents are displayed in a window as shown in FIG. 20, next the window is deleted by clicking the mouse 28 (steps 323 and 328) and control is returned to the step 316. Similarly, in the case of type display (a step 324), the contents are displayed in a window (a step 325), the window is deleted by the next click (the steps 323 and 328) and control is returned to the step 316. In the case of terminal display (a step 326), an optional window is displayed (a step 327), the process A is executed, next it is determined whether left/right scrolling is performed or not, in the case of the left/right scrolling, the window is deleted (a step 331), the cursor is moved to the corresponding terminal (a step 332) and control is returned to the step 316. When no left/right scrolling is performed, control is returned to a step 329. The user display process, the type display process and the terminal display process in the steps 321 to 332 are hereinafter called a process B.

Next, it is determined whether state monitoring is selected or not (a step 333), when the state monitoring is not selected, control is returned to the step 316 and when the state monitoring is selected, a state monitor screen is displayed as shown in FIG. 21 or 33 (a step 334).

In steps 335 and 336, the processes A and B are executed, when the process B, that is, user display, type display or terminal display is finished, control is returned to the step

38

335, when display is not selected in the process B, it is determined in a step 337 whether the next terminal equipment is selected or not, when the next terminal equipment is selected, it is displayed in a step 338 and control is returned to the step 335. When the next terminal equipment is not selected, it is determined in a step 339 whether the last terminal equipment is selected or not, when the last terminal equipment is selected, it is displayed in a step 340 and control is returned to the step 335. When the last terminal equipment is not selected, it is determined whether return is selected or not (a step 341) and when return is selected, control is returned to the terminal list display in the step 315. When return is not selected, it is determined whether MENU is selected or not (a step 342) and when MENU is selected, a submenu screen shown in FIG. 22 is displayed in a window (a step 343). When MENU is not selected, control is returned to the process A in the step 335. When a submenu is displayed in a window, an input wait list and a failure list are detected in the process A in a step 344, when input is made by clicking the mouse 28, the window is deleted (a step 345), it is determined in steps 346, 353, 354 and 355 which submenu is selected and when no selection from the menu is made due to operation mistake, control is returned to the step 343.

When a performance history is selected in the step 346, the PPC performance history screen shown in FIG. 23 is displayed

referring to the PPC data file, the process A is executed in a step 348 and the process B is executed in a step 349. When window display is finished in the process B, control is returned to the process A in the step 348. In case the process B is not selected, it is determined in steps 350, 351 and 356 whether return, display, a time base, the change of the object or left/right scrolling is selected or not and when nothing is selected, control is returned to the step 348. When return is selected in the step 350, control is returned to the step 334, the state monitoring screen is displayed, when change is selected in the step 351, a changed screen including a graph showing the variation of exposure voltage shown in FIG. 24 for example is displayed (a step 352) and control is returned to the step 348. When a left/right cursor is selected in the step 356, a date cursor moves left/right (a step 357) and control is returned to the step 348.

When a failure history is selected in the step 353, the failure history screen shown in FIG. 25 is displayed (a step 358), referring to the PPC failure history file, the process A (a step 359) and the process B (a step 360) are executed and when a window is deleted in the process B, control is returned to the step 359. When the process B is not selected, the selection of return or upward/downward scrolling is determined (steps 361 and 362), when the upward/downward scrolling is selected, the screen is scrolled upward/downward in a step 363

40

and when nothing is selected, when return is selected and when the upward/downward scrolling is finished, control is returned to the step 334.

Similarly, when a replacement history is selected in the step 354, the screen is displayed as shown in FIG. 26 and the selection of the upward/downward scrolling is also determined (steps 364 to 368). When the upward/downward scrolling is not selected, the selection of the name of a replacement part is determined (a step 370), a product name window is displayed (a step 371), the process A is executed, the corresponding product name is input (a step 372) and it is displayed (a step 373). When "No" is selected in the step 370 and when the steps 373 and 369 are finished, control is returned to the step 365.

When the number of copies is selected in the step 355, the total number of copies shown in FIG. 27 is displayed in a step 374, similarly the process A for the detection of input to the selection of left/right scrolling are determined (steps 374 to 378), the selection of the change of the time base and the change of size is determined in steps 380 and 381, in the case of the change of the time base, time bases to be selected are displayed in a window (a step 385) and after the process A is executed in a step 386, a changed screen is displayed (a step 387). In the case of the change of size, size names to be selected are displayed in a window as shown in FIG. 28 (a step 382) and after the process A is executed in the step 386,

41

a changed screen is displayed as shown in FIG. 29 (a step 384).

In the meantime, when replaced time announcement is selected in a step 309, terminal numbers are sorted in order higher in a duty cycle based upon the duty cycle list (a step 388) and a replaced time announcement screen shown in FIG. 30 is displayed. The process A is executed (a step 390), it is determined in steps 391 to 396 which of return, upward/downward scrolling, state monitoring and an estimate is selected, in case return is selected, control is returned to the menu screen in the step 301 and in case upward/downward scrolling is selected, control is returned to the step 390 after the screen is scrolled upward/downward (the step 394). In case state monitoring is selected, control is returned to the step 334, in case the estimate is selected, an estimated period window shown in FIG. 31 is displayed (a step 397), after the process A is executed (a step 398), an estimated value is calculated based upon result data (a step 399) and estimate data is displayed (a step 400). In case the above-mentioned are not selected and when the step 400 is finished, control is returned to the step 390.

When copy charge management is selected in the step 310, the data of the number of copies for that month is loaded from the PPC data file in a step 401, a charge list every copying machine shown in FIG. 34 is displayed and after the process A, that is, an input process (a step 403), it is determined

42

in steps 404, 406, 409, 413, 415 and 416 which of left/right scrolling, the change of a displayed month, settlement, printing, the process B and return is selected.

When left/right scrolling is selected, it is executed (a step 405) and control is returned to the step 403. When the change of a displayed month is selected, Jan. to Dec. are displayed in a window, a displayed month is selected (a step 407), the charge data of the corresponding month is displayed (a step 408) and control is returned to the step 403. When settlement is selected, a settled month and its period are displayed in a window as shown in FIG. 35 and thereby, a settled date is specified (a step 410). A charge for the specified period is calculated (a step 411), it is saved in the PPC charge data file (a step 412) and control is returned to the step 403. When printing is selected, a printing process is executed by the printer 26 (a step 414) and control is returned to the step 403. In case the display of the process B in the window is finished in the step 415 and in case return is not selected in the step 416, control is also returned to the step 403. When return is further selected, control is returned to the display of the menu screen in the step 301.

When user registration or type registration is selected in the step 311 or in the step 312, data is loaded from the PPC user information file or the PPC type information file (a step 417) and a list is displayed as shown in FIG. 36 or 37

43

(a step 418). After the process A (a step 419), it is determined in steps 420, 422, 424, 428, 430 and 431 which of a cursor key, change, deletion, addition, the process B and return is selected, when the cursor key is selected, the screen is scrolled upward/downward (a step 421) and when change is selected, changed data is input (a step 423). When deletion is selected, it is determined whether terminal registration is already made or not (a step 425), when terminal equipment is not registered, an error message is displayed in a window (a step 426) and when terminal equipment is registered, a deletion process is executed (a step 427). When addition is selected, added data is input (a step 429) and when the process B is selected and when the above-mentioned processing is finished, control is returned to the step 419. When return is selected, data is loaded into the PPC user information file or the PPC type information file (a step 432), control is returned to the menu screen in the step 301 and when return is not selected, control is returned to the step 419.

Finally, when terminal registration is selected in the step 313, operation substantially similar to that in the steps 417 to 432 is executed in steps 433 to 447. That is, a list of copying machines the terminal equipment of which are registered as shown in FIG. 38 is displayed based upon data in the PPC terminal information file in a step 434 and data processed in a step 447 is saved in the PPC terminal information

44

file. However, the operation is different from that in the above-mentioned steps in that at the time of deletion, the determination of terminal registration is not performed and copying machines are sorted in the order of terminal numbers in a step 446 before data is saved in the PPC terminal information file.

Next, a transformed example of this embodiment will be described. FIG. 10 is a block diagram showing the configuration of the transformed example and FIG. 11 shows an example of the configuration of a telegraphic message including data transmitted from the communication unit to the center system at that time. In this example, plural copying machines 1' are connected to one communication unit 3'. Therefore, as shown in FIG. 11, a 4-digit terminal number (code) is written to the telegraphic message sent from the communication unit 3' to the center system 4 and after that, the data of the terminal is written. As the other configuration and operation are substantially similar to those in the above-mentioned embodiment, the description is omitted.

Next, another embodiment of the invention will be described. The above-mentioned embodiment is described using the example using a copying machine as terminal equipment, however, in this embodiment, a vending machine is used for terminal equipment. For the configuration, as the configuration is similar to that shown in FIG. 1 or 10 when

a vending machine is substituted for the copying machine 1 or

1', the description is omitted.

To explain a vending machine that sells a beverage such

as juice and coffee in a paper cup as an example, failure

information includes the shortage of material such as coffee

powder and juice material, the shortage of cups, the shortage

of material such as carbon dioxide, full drainage bucket and

the failure of a coin mechanism. Supply information includes

the duty cycle of material such as juice and coffee. FIGs.

39 to 42 show an example of display on a data display in another

embodiment.

FIG. 39 corresponds to FIG. 17 in the first embodiment

and shows a screen when a vending machine is selected on a menu

screen. On the screen, the terminal number, the user name and

the type name of vending machines are displayed and the vending

machine of a target is selected using a mouse 28. At this time,

for the vending machine fails in failure information and the

vending machine requiring supply in supply information, such

a message is displayed in the field of failure and replacement

information.

FIG. 40 corresponds to FIG. 30, shows a display screen

of supplied time announcement and when supplied time

announcement is selected on the menu screen, the screen is

displayed. In this case, vending machines are displayed in

order higher in the usage rate of material such as juice

46

material and coffee powder which are supply items. When an estimate is selected as shown in FIG. 41, the further usage rate after one week or one month can be estimated based upon the usage rate and used quantity up to date and the next supplied day can be estimated.

FIG. 42 shows a display screen of the failure history of a vending machine and corresponds to FIG. 25. In this case, a date when failure occurs and the contents are displayed every vending machine.

In the first embodiment, the duty cycle of the waste toner bottle and developer is acquired based upon the number of copies, however, the invention is not limited to this method and it need scarcely be said that the duty cycle may be also directly acquired based upon the weight.

In the above-mentioned two embodiments, the copying machine and the vending machine are used for terminal equipment, however, the invention is not limited to these and it need scarcely be said that the invention can be applied to all facilities and devices requiring field service.

[Effect]

As described above, as the duty cycle of consumable supplies such as a photoconductive drum and a developer tank is acquired based upon copies number data and terminal equipment are displayed in order more in the used quantity (the duty cycle) in the invention, it can be informed in the order

47

of terminal equipment requiring replacement or supply that replacement or supply is required and as the use of consumable supplies after a predetermined period can be estimated, the replaced time or the supplied time can be grasped, and the shortage of parts and the shortage of merchandise are prevented from occurring. As use information is initialized after replacement or supply, excellent effect such as the reliability of use information is enhanced is produced.

4. Brief Description of the Drawings

FIG. 1 is a schematic block diagram showing the configuration of a centralized control system using a remote controller according to the invention; FIG. 2 is a block diagram showing the configuration of an interface circuit; FIG. 3 is a block diagram showing the configuration of a communication unit; FIG. 4 is a block diagram showing the configuration of a center system which is the remote controller according to the invention; FIG. 5 is a timing chart showing relationship between a state of a select signal and the output timing of data; FIG. 6 shows an example of a telegraphic message including data sent from the communication unit to the center system; FIG. 7 shows an example of a telegraphic message including directive data sent from the center system to the communication unit; FIG. 8 is a block diagram showing the configuration of a central processing unit of the center system; FIG. 9 shows a list of display contents; FIG. 10 is a block diagram showing

the configuration of a transformed example; FIG. 11 shows an example of a telegraphic message including data sent from a communication unit to a center system in the transformed example; FIG. 12 is a flowchart showing the contents of processing by a send/receive processor; FIGs. 13 are flowcharts showing the contents of processing by a received text processor; FIGs. 14 are flowcharts showing the contents of processing by a data display; FIGs. 15 to 38 show a display screen; and FIGs. 39 to 42 show a display screen of a remote controller equivalent to another embodiment.

1. Copying machine (Vending machine), 2. Interface circuit, 3. Communication unit, 4. Center system, 233. Received text processor, 235. Input processor, 236. Data display

21. POWER SOURCE

30. INPUT DEVICE

FIG. 4

6. TELECOMMUNICATION LINE

22. MODEM

23. CENTRAL PROCESSING UNIT

24. MEMORY

25. MONITOR

26. PRINTER

27. KEYBOARD

28. MOUSE

FIG. 5

A3 HIGH ORDER

A3 LOW ORDER

A4 LOW ORDER

B5 LOW ORDER

FAILURE MODE

FIG. 6

COMMUNICATION MODE

COMMUNICATION UNIT CODE (4 DIGITS)

NUMBER OF COPIES (4 DIGITS)

EXPOSURE VOLTAGE (4 DIGITS), MAXIMUM, MINIMUM, AVERAGE

BIAS VOLTAGE (4 DIGITS), MAXIMUM, MINIMUM, AVERAGE

HEAT ROLLER TEMPERATURE (4 DIGITS), MAXIMUM, MINIMUM, AVERAGE

TROUBLE OCCURRENCE/RECOVERY

TROUBLE CODE

PART CODE

FIG. 7

COMMUNICATION MODE

COMMUNICATION UNIT CODE (4 DIGITS)

CENTER SYSTEM NUMBER (15 DIGITS)

COMMUNICATION UNIT CALL TIME

DAY OF WEEK, HOUR, MINUTE

CURRENT TIME, DAY OF WEEK, HOUR, MINUTE

DAY OF WEEK CODE

0: SAME AS LAST SPECIFICATION

1. SUNDAY

2. MONDAY

3. TUESDAY

4. WEDNESDAY

5. THURSDAY

6. FRIDAY

7. SATURDAY

8. EVERY DAY

9. NO FIXED TIME SENDING

FIG. 8

22. MODEM

231. SEND/RECEIVE PROCESSOR

232. RECEIVED TEXT BUFFER

233. RECEIVED TEXT PROCESSOR

234. FILE STORAGE

235. INPUT PROCESSOR

236. DATA DISPLAY

DATA REGISTRATION

DISPLAY REQUEST

FIG. 9

- MENU DISPLAY

FAILURE RETRIEVAL

PPC SELECTION

PPC SELECTION MENU

STATE MONITORING

REPLACED TIME ANNOUNCEMENT

COPY CHARGE MANAGEMENT

COPY CHARGE DISPLAY

DISPLAYED MONTH CHANGE

SETTLEMENT

PRINTING

USER REGISTRATION

TYPE REGISTRATION

TERMINAL REGISTRATION

- PPC STATE DISPLAY

PPC PERFORMANCE HISTORY

PPC PERFORMANCE HISTORY DISPLAY

DISPLAY FORMAT CHANGE

TIME BASE CHANGE

DISPLAY OBJECT CHANGE

PPC FAILURE HISTORY

PPC FAILURE HISTORY DISPLAY

PPC REPLACEMENT HISTORY

PPC REPLACEMENT HISTORY DISPLAY

REPLACED PART NAME

CHANGE

COPIES NUMBER DISPLAY

TIME BASE

CHANGE

USER

USER INFORMATION DISPLAY

TYPE

TYPE INFORMATION DISPLAY

TERMINAL

TERMINAL CHANGE DISPLAY

TERMINAL NUMBER

CHANGE

FIG. 10

1. COPYING MACHINE

2 INTERFACE CIRCUIT

3. COMMUNICATION UNIT

3. CENTER SYSTEM

6. TELECOMMUNICATION LINE

FIG. 11

COMMUNICATION MODE

COMMUNICATION UNIT CODE (4 DIGITS)

TERMINAL CODE (4 DIGITS)

NUMBER OF COPIES (4 DIGITS)

EXPOSURE VOLTAGE (4 DIGITS), MAXIMUM, MINIMUM, AVERAGE

BIAS VOLTAGE (4 DIGITS), MAXIMUM, MINIMUM, AVERAGE

HEAT ROLLER TEMPERATURE (4 DIGITS), MAXIMUM, MINIMUM, AVERAGE

TROUBLE OCCURRENCE/RECOVERY

TROUBLE CODE

PART CODE

TERMINAL CODE (4 DIGITS)

FIG. 12

START

101. IS CALL RECEIVED?

103. EXECUTE RECEIVED DATA STORAGE PROCESS

104. DOES RECEIVE ERROR OCCUR?

105. EXECUTE ACK SENDING PROCESS

106. EXECUTE NAK SENDING PROCESS

114. IS THERE DATA TO BE TRANSMITTED?

107. EXECUTE DATA SENDING PROCESS

108. IS TERMINATION NORMAL?

109. EXECUTE NORMAL LINE DISCONNECTION PROCESS

110. EXECUTE ERROR LINE DISCONNECTION PROCESS

111. EXECUTE LINE DISCONNECTION CHECK PROCESS

112. DOES RECEIVED TEXT BUFFER HAVE FREE SPACE?

113. EXECUTE RECEIVE BUFFER WAIT PROCESS

END

FIG. 13A

START

201. IS TEXT RECEIVED?

202. EXECUTE RECEIVED DATA EXTRACTION PROCESS

203. DOES ERROR OCCUR?

204. SET COMMUNICATION MODE, COMMUNICATION UNIT CODE AND DATE

205. IS CALL POWER ON CALL?

206. IS CALL FIXED TIME CALL?

207. IS CALL FAILURE CALL?

208. IS CALL PART REPLACEMENT CALL?

209. IS CALL TEST CALL?

210. CLEAR FILE FOR THAT DAY AND INITIALIZE

211. STORE RECEIVED DATA IN TEST FILE

END

FIG. 13B

220. UPDATE COPIES NUMBER MEMORY EVERY TERMINAL AND EVERY SIZE

221. CALCULATE CUMULATIVE NUMBER OF COPIES

222. CALCULATE DUTY CYCLE EVERY PART

223. DOES DUTY CYCLE EXCEED 100%?

224. REGISTER IN REPLACEMENT REQUIREMENT LIST

225. MAKE DUTY CYCLE LIST

226. MAKE ESTIMATE LIST

227. UPDATE MEASUREMENT DATA MEMORY

228. IS CURRENT MODE PART REPLACEMENT MODE?

229. CALCULATE DUTY CYCLE OF PART

230. IS DUTY CYCLE 100% OR LESS?

231. DELETE REPLACEMENT REQUIREMENT LIST

232. SET CURRENT CUMULATIVE NUMBER OF COPIES

233. REGISTER IN PPC REPLACEMENT HISTORY FILE EVERY PART

234. IS CURRENT MODE FAILURE MODE?

235. WRITE DATA IN COPIES NUMBER MEMORY EVERY SIZE AND DATA

IN MEASUREMENT DATA MEMORY TO PPC DATA FILE FOR THAT DAY

END

240. DOES TROUBLE OCCUR OR RECOVER?

OCCURS, RECOVERS

241. EXECUTE RECEIVED DATA EXTRACTION PROCESS

242. REGISTER TERMINAL CODE IN FAILURE LIST

243. REGISTER TERMINAL CODE AND DATE IN FAILURE HISTORY FILE

EVERY TERMINAL

FIG. 14A

START

300. EXECUTE INITIALIZATION PROCESS

301. DISPLAY MENU SCREEN

302. DOES FAILURE LIST EXIST?

303. EXECUTE FAILURE BLINKING PROCESS

304. DOES REPLACEMENT REQUIREMENT LIST EXIST?

305. EXECUTE FAILURE BLINKING PROCESS

306. IS INPUT MADE?

307. FAILURE RETRIEVAL?

308. PPC SELECTION?

309. REPLACED TIME ANNOUNCEMENT?

310. COPY CHARGE MANAGEMENT?

311. USER REGISTRATION?

312. TYPE REGISTRATION?

313. TERMINAL REGISTRATION?

FIG. 14B

314. SCROLL UPWARD/DOWNWARD

315. DISPLAY TERMINAL LIST

316. IS INPUT MADE?

317. DOES FAILURE LIST EXIST?

318. BLINK DURING FAILURE

319. RETURN?

321. USER?

322. DISPLAY CONTENTS WINDOW

323. IS MOUSE CLICKED?

324. TYPE?

325. DISPLAY CONTENTS WINDOW

326. TERMINAL?

327. DISPLAY SELECTION WINDOW

328. DELETE WINDOW

329. EXECUTE PROCESS A

331. DELETE WINDOW

332. MOVE CURSOR TO CORRESPONDING TERMINAL

333. STATE MONITORING?

334. DISPLAY STATE MONITORING SCREEN

335. EXECUTE PROCESS A

336. EXECUTE PROCESS B

FIG. 14C

338. DISPLAY NEXT TERMINAL

340. DISPLAY LAST TERMINAL

341. RETURN?

343. DISPLAY MENU SCREEN WINDOW

344. EXECUTE PROCESS A

345. DELETE WINDOW

346. PERFORMANCE HISTORY?

347. DISPLAY PERFORMANCE HISTORY SCREEN

348. EXECUTE PROCESS A

349. EXECUTE PROCESS B

350. RETURN?

351. IS DISPLAY CHANGE, TIME BASE CHANGE OR OBJECT CHANGE
SELECTED?

352. DISPLAY CHANGED SCREEN

353. FAILURE HISTORY?   REPLACEMENT HISTORY?   NUMBER OF
COPIES?

357. MOVE DATE CURSOR TO LEFT/RIGHT

FIG. 14D

358. DISPLAY FAILURE HISTORY SCREEN

359. EXECUTE PROCESS A

360. EXECUTE PROCESS B

361. RETURN?

363. SCROLL UPWARD/DOWNWARD

364. DISPLAY REPLACEMENT HISTORY SCREEN

365. EXECUTE PROCESS A

366. EXECUTE PROCESS B

367. RETURN?

369. SCROLL UPWARD/DOWNWARD

370. IS SELECTION OF REPLACED PART NAME RIGHT?

371. DISPLAY PRODUCT NAME WINDOW

372. EXECUTE PROCESS A

373. DISPLAY CORRESPONDING PRODUCT NAME SCREEN

374. DISPLAY TOTAL NUMBER OF COPIES

375. EXECUTE PROCESS A

376. EXECUTE PROCESS B

377. RETURN?

379. MOVE DATE CURSOR TO LEFT/RIGHT

380. TIME BASE CHANGE?

381. SIZE CHANGE?

382. DISPLAY SIZE NAME WINDOW

383. EXECUTE PROCESS A

384. DISPLAY CHANGED SCREEN

385. DISPLAY TIME BASE WINDOW

386. EXECUTE PROCESS A

387. DISPLAY CHANGED SCREEN

FIG. 14E

388. SORT TERMINAL NUMBERS IN ORDER HIGHER IN DUTY CYCLE

389. DISPLAY REPLACED TIME ANNOUNCEMENT SCREEN

390. EXECUTE PROCESS A

391. EXECUTE PROCESS B

392. RETURN?

394. SCROLL UPWARD/DOWNWARD

395. STATE MONITORING?

396. ESTIMATE?

397. DISPLAY ESTIMATED PERIOD WINDOW

398. EXECUTE PROCESS A

399. ESTIMATE VALUE

400. DISPLAY ESTIMATE DATA

450. SORT TERMINAL NUMBERS IN ORDER HIGHER IN DUTY CYCLE

FIG. 14F

401. LOAD DATA FOR THAT MONTH

402. DISPLAY CHARGE LIST

403. EXECUTE PROCESS A

405. MOVE CURSOR AND SCROLL LEFT/RIGHT

406. DISPLAYED MONTH CHANGE?

407. SELECT DISPLAY MONTH

408. DISPLAY DATA OF CORRESPONDING MONTH

409. SETTLEMENT?

410. SPECIFY SETTLEMENT DAY

411. CALCULATE CHARGE

412. SAVE DATA

413. PRINTING?

414. PRINT

415. EXECUTE PROCESS B

416. RETURN?

FIG. 14G

417. LOAD DATA

418. DISPLAY LIST

419. EXECUTE PROCESS A

420. CURSOR KEY?

421. MOVE CURSOR AND SCROLL UPWARD/DOWNWARD

422. CHANGE?

423. INPUT CHANGED DATA

424. DELETION?

425. IS TERMINAL REGISTERED?

426. DISPLAY ERROR WINDOW

427. DELETE

428. ADDITION?

429. INPUT ADDED DATA

430. EXECUTE PROCESS B

431. RETURN?

432. SAVE DATA

FIG. 14H

433. LOAD DATA

434. DISPLAY LIST

435. EXECUTE PROCESS A

436. CURSOR KEY?

437. MOVE CURSOR AND SCROLL UPWARD/DOWNWARD

438. CHANGE?

439. INPUT CHANGED DATA

440. DELETION?

441. DELETE

442. ADDITION?

443. INPUT ADDED DATA

444. EXECUTE PROCESS B

445. RETURN?

446. SORT TERMINAL NUMBERS

447. SAVE TERMINAL DATA

FIG. 15, FIG. 16

FAILURE RETRIEVAL

PPC SELECTION

REPLACED TIME ANNOUNCEMENT

COPY CHARGE MANAGEMENT

SELECT PROCESSING

USER REGISTRATION

TYPE REGISTRATION

TERMINAL REGISTRATION

FIG. 17, FIG. 18, FIG. 19, FIG. 20

- PPC SELECTION -

TERMINAL

63

USER

TYPE

TERMINAL NO.

USER NAME

TYPE NAME

FAILURE/REPLACEMENT INFORMATION

MONITOR STATE

RETURN

FIG. 18

REPLACE PARTS

FIG. 19

FAILURE OCCURS   REPLACE PARTS

FIG. 20

ZIP CODE

ADDRESS

SERIAL NO.

FIG. 21, FIG. 22

- PPC STATE MONITORING -

(AS OF OCT. 19, 1989)

TERMINAL

USER

TYPE

- NUMBER OF COPIES UP TO DATE, (ACCUMULATED TOTAL)

- FAILURE SITUATION NORMAL

EXPOSURE VOLTAGE

DEVELOPING BIAS VOLTAGE

HEAT ROLLER TEMPERATURE

DRUM DUTY CYCLE

DEVELOPER DUTY CYCLE

WASTE TONER BOTTLE DUTY CYCLE

RETURN

FIG. 22

PPC PERFORMANCE HISTORY

PPC FAILURE HISTORY

PPC REPLACEMENT HISTORY

PPC NUMBER OF COPIES

FIG. 23, FIG. 24

- PPC PERFORMANCE HISTORY -

TERMINAL

USER

TYPE

AVERAGE VALUE, EXPOSURE VOLTAGE, DEVELOPING BIAS VOLTAGE, HEAT
ROLLER TEMPERATURE

VOLTAGE

TIME (MONTH)

TEMPERATURE

CHANGE OBJECT, CHANGE TIME BASE, CHANGE DISPLAY, RETURN

FIG. 24.

EXPOSURE VOLTAGE, MAXIMUM, MINIMUM

FIG. 25

- PPC FAILURE HISTORY -

TERMINAL

USER

TYPE

CURRENT SITUATION --- NORMAL

OCCURRENCE DATE, TROUBLE CONTENTS, EXPOSURE VOLTAGE, DEVELOPING BIAS VOLTAGE, HEAT ROLLER TEMPERATURE, RECEIVED TIME

RETURN

FIG. 26

- PPC REPLACEMENT HISTORY -

TERMINAL

USER

TYPE

DRUM REPLACEMENT HISTORY

REPLACED DATE

DUTY CYCLE

REPLACED PART NAME

RETURN

FIG. 27, FIG. 28, FIG. 29

- PPC NUMBER OF COPIES - (TOTAL)

TERMINAL

USER

TYPE

NUMBER OF COPIES, EVERY DAY, ACCUMULATED TOTAL

TIME (MONTH)

CHANGE SIZE, CHANGE TIME BASE, RETURN

FIG. 28

OTHERS

FIG. 30, FIG. 31, FIG. 32

- REPLACED TIME ANNOUNCEMENT -

TERMINAL

USER

TYPE

TERMINAL NUMBER/USER NAME, USED SITUATION, DRUM, DEVELOPER,

WASTE TONER BOTTLE

REQUIRES SUPPLY

ESTIMATE, MONITOR STATE, RETURN

FIG. 31

AFTER ONE WEEK

AFTER ONE MONTH

FIG. 32

ESTIMATE (AFTER ONE WEEK)

FIG. 33

- PPC STATE MONITORING - (AS OF OCT. 19, 1989)

TERMINAL

USER

TYPE

- NUMBER OF COPIES UP TO DATE (ACCUMULATED TOTAL)

- FAILURE SITUATION, FIXING ERROR

EXPOSURE VOLTAGE, DEVELOPING BIAS VOLTAGE, HEAT ROLLER

TEMPERATURE, DRUM DUTY CYCLE, DEVELOPER DUTY CYCLE, WASTE TONER

BOTTLE DUTY CYCLE

RETURN, FAILURE OCCURS

FIG. 34, FIG. 35

- COPY CHARGE MANAGEMENT -

TERMINAL

USER

TYPE

JUN., 1989

YEN

CHANGE DISPLAYED MONTH, SETTLE, PRINT, RETURN

FIG. 35

CALCULATION FOR JUL.

JUN. 21 TO JUL. 20

FIG. 36

- USER INFORMATION REGISTRATION -

FIRST, SECOND, THIRD, FOURTH, FIFTH, SIXTH

ZIP CODE, USER NAME, ADDRESS, PHONE NO.

CHANGE, DELETE, ADD, RETURN

FIG. 37

- PPC TYPE REGISTRATION -

TYPE NAME, EXPOSURE, BIAS, HEAT ROLLER, DRUM, DEVELOPER, WASTE

TONER BOTTLE

REPLACED NUMBER, SET DATE

CHANGE, DELETE, ADD, RETURN

FIG. 38

- TERMINAL INFORMATION REGISTRATION -

TERMINAL NO., TYPE NAME, SERIAL NO., USER NAME

CHANGE, DELETE, ADD, RETURN

FIG. 39

- VENDING MACHINE SELECTION -

TERMINAL

USER

TYPE

TERMINAL NUMBER, USER NAME, TYPE NAME, FAILURE/REPLACEMENT

INFORMATION

MONITOR STATE, RETURN

FIG. 40, FIG. 41

- SUPPLIED TIME ANNOUNCEMENT -

TERMINAL

USER

TYPE

TERMINAL NUMBER/USER NAME, USED SITUATION, MERCHANDISE A, B,

C

REQUIRES SUPPLY

ESTIMATE, MONITOR STATE, RETURN, FAILURE OCCURS

FIG. 41

ESTIMATE (AFTER ONE WEEK)

FIG. 42

69

- VENDING MACHINE FAILURE HISTORY -

TERMINAL

USER

TYPE

CURRENT SITUATION --- NORMAL

OCCURRENCE DATE, TROUBLE CONTENTS, RECEIVED TIME

RETURN

複写機1とのデータの授受、そのデータの解析処理及び複写機1の監視を行っている。また複写機1から異常データが送信された場合及びメモリ部17に格納されている時刻と計時装置18の時刻とが一致した場合に、中央制御装置16は設定されたデータ送信先の番号をNCU20に送り、通信回線6の接続を行い、モデム19及び通信回線6を経由してセンタ装置4とデータの授受を行う。

第4図は本発明の遠隔管理装置であるセンタ装置の構成を示すブロック図であり、センタ装置4は例えばパーソナルコンピュータ又はオフィスコンピュータを用いてなり、中央処理部23に通信回線6とデータの授受を行うモデム22、データ及びプログラムを格納するROM，RAM及び補助記憶装置を含む記憶部24、画像及びデータを表示するモニタ25、必要事項を印書するプリンタ26、データを入力するキーボード27及びモニタ25上の位置を指定するマウス28を接続して構成される。中央処理部23に与えられたデータは後述する如く（第8図参照）送受信処理部231、テキストバッファ部

232、受信テキスト処理部233及びファイル格納部234の順に送られ処理される。また入力処理部235からのデータ登録及び表示要求指令によりファイル格納部234のデータがデータ表示部236に送られ、モニタ25で表示できるように加工される。

次にI/F回路2、通信ユニット3及びセンタ装置4の機能について詳述する。

I/F回路2は複写機1を管理するのに必要なデータを通信ユニット3を介してセンタ装置4に提供する機能を担っており、I/F回路2が収集するデータは例えば複写機1の場合、サイズ別コピー枚数、露光電圧、現像バイアス電圧等の主要部の電圧、ヒートローラ温度等の主要部の温度、位置別紙づまり、トナー（デベロッパ）切れ、紙切れ及び電圧異常等の故障情報、電源のオン／オフ、複写中の複写機情報等の情報がある。これらのデータのうちサイズ別コピー枚数並びに主要部の電圧及び温度は複写機1が動作する度に測定してバッファ部10に一時的に蓄え、通信ユニット3からの要求に応じてデータ授受部11を経由して転送さ

れるが、故障情報及び複写機情報は通信ユニット3が常時監視できるようになっている。なお伝送路5から伝送するデータ量が多いときは、伝送路5の線数を削減するため、時分割によりデータを伝送してもよい。

第1表はI/F回路2及び通信ユニット3間の伝送路5での信号の構成の一例を示すものであり、I/F回路2と通信ユニット3との間は8ビットのデータ信号と4ビットのセレクト信号及び4ビットのステータス信号で接続されている。

（以下余白）

Table 1 (see P.12)

第 1 表

① 信号名		② 方向 複写機 通信ユニット	③ 内 容
データ信号 ④	Data 0 Data 1 ⋮ Data 6 Data 7	⑤ ──→	Select 0～3 に対応したサイズ別コピー枚数測定データ故障情報などを出力
セレクト信号 ⑥	Select 0 Select 1 Select 2 Select 3	⑦ ←──	出力データを選択
ステータス信号 ⑧	Trouble	⟹	⑨ 故障発生を示す
	CopyRDY	⟹	⑩ コピー可を示す
	Power	⟹	⑪ 電源ONを示す
	GND	⟺	

第2表はセレクト信号の状態とデータとの関係の一例を示すものであり、セレクト信号の各ビットS0～S3のセット、リセット（＝1，0）に応じてサイズ別コピー枚数、露光電圧、現像バイアス電圧、ヒートローラ温度、故障モード等のデータが8ビットのデータ信号Data0 ～Data7 で出力さ

Table 2 (see P.13)

第 2 表

S3	S2	S1	S0	内　　容
0	0	0	0	A3 コピー枚数 上位2桁
0	0	0	1	A3 コピー枚数 下位2桁
0	0	1	0	A4 コピー枚数 上位2桁
0	0	1	1	A4 コピー枚数 下位2桁
0	1	0	0	B4 コピー枚数 上位2桁
0	1	0	1	B4 コピー枚数 下位2桁
0	1	1	0	B5 コピー枚数 上位2桁
0	1	1	1	B5 コピー枚数 下位2桁
1	0	0	0	光電圧 上位2桁
1	0	0	1	光電圧 下位2桁
1	0	1	0	現像バイアス電圧 上位2桁
1	0	1	1	現像バイアス電圧 下位2桁
1	1	0	0	定着温度 上位2桁
1	1	0	1	定着温度 下位2桁
1	1	1	0	故障モード
1	1	1	1	予備

第5図はセレクト信号の状態とデータの出力タイミングとの一例を示す図であり、I/F回路2の制御部12は複写機1のデータを収集すると共に、通信ユニット3からのセレクト信号S0〜S3の状態を監視しており、セレクト信号S0〜S3の状態に応じたデータを常にデータ信号 Data0〜7 で出力している。また複写機1に故障が発生した場合、直ちにTrouble信号をオンすると同時に故障内容を示す故障モード番号（トラブルコード）をバッファ部10の図示しない故障レジスタにセットし、通信ユニット3からの故障モード番号の要求（セレクト信号 S3.S2.S1.S0＝1110）に備える。またコピー動作中はCopyRDY信号をオフし、この間にセンサ7，7…で検出された測定データは保証しないことを通信ユニット3に告知している。

通信ユニット3は複写機1を常時監視しつつ、複写機1から送られたデータの一次処理を行う。1次処理としては例えばサイズ別コピー枚数の管理、主要部の電圧及び温度の最大値／最小値の管理並びに平均値の算出等の処理がある。また常時監視項目としては電源のオン／オフ、複写中監視及び故障状況監視等の項目がある。

通信ユニット3は通常、電源オン状態で複写機1がレディ状態（CopyRDY信号オン）になったタイミングでセレクト信号を切り替えて、サイズ別コピー枚数並びに主要部の電圧及び温度等の測定データを読んでいる。

またTrouble信号がセットされると、セレクト信号を切り替え、故障モード番号（トラブルコード）を読み取って、故障内容を判定する。故障内容は例えば予め決められたレベル（大故障、中故障、小故障など）に分類され、大故障の場合は即時にセンタ装置4に発呼して複写機1に重大な故障が生じていることを知らせる。また中故障の場合はそれが所定の回数に達した場合にセンタ装置4に通報し、小故障の場合は定時通信時にデータとして送信する。

Power信号をオフすると、それまで読み取ったサイズ別コピー枚数を一旦メモリ部17に格納し、メモリバックアップ機能がない複写機の場合は以後のデータとセーブしたデータとを加算して新たな読み取りデータとする。

通信ユニット3は複写機1のサイズ別コピー枚数及び測定データをセンタ装置4に伝送する機能があるが、センタ装置4への発呼タイミングは以下の5種を設定している。

(1) Power ON発呼：通信ユニット3をPower ONしたとき

(2) 定時発呼　　：定められた時刻（通常1回／1日）

(3) 故障発生発呼：通報を要する故障が発生したとき及びそれが復旧したとき

(4) 部品交換発呼：サービスマンが部品を交換し、発呼指示したとき

(5) 通信テスト発呼：通信テストスイッチを押したとき

発呼先は、通常は予め定められたセンタ装置4だけであるが、休日、深夜等の休業時を考慮して本実施例では全部で3ヶ所の発呼先を設定できるようになっている。またセンタ装置4からの指示により発呼先や定時発呼の時刻を変更することも可能である。

センタ装置4へのデータ伝送中に故障が発生する場合などを考慮し、発呼先にはプライオリティをもたせており、プライオリティの高い順に通信ユニット3はデータを伝送する。次に各発呼タイミングについて詳しく説明する。

data. Next, a measurement data memory is updated based upon received data (a step 227) and it is judged whether a mode of a call is the replacement of parts or not (a step 228). In the case of a part replacement mode, the duty cycle of the part is calculated (a step 229), it is determined whether the duty cycle is 100% or less or not (a step 230) and as the part is already replaced in case the duty cycle is 100% or less, the part is deleted from the replacement requirement list (a step 231). The current cumulative number of copies is set (a step 232), the total number of copies during a part used period is registered based upon the cumulative number of copies set in the PPC replacement history file every part (a step 233) and the processing is terminated.

When the mode of a call is not the replacement of parts at the step 228, it is next determined whether the mode of a call is failure or not (a step 234), in the case of a failure call, the processing is terminated as it is and when the mode of a call is not failure, the number of copies every size and measurement data are written to a PPC data file for that day (a step 235) and the processing is terminated.

In the meantime, when the mode of a call is failure at the step 207, it is determined whether failure occurs or is recovered (a step 240), when the failure is recovered, a status of the failure is deleted from the failure list (a step 241) and the processing proceeds to the step 220. When failure

35

DRAWINGS

FIG. 1

1. COPYING MACHINE

2. INTERFACE CIRCUIT

3. COMMUNICATION UNIT

4. CENTER SYSTEM

6. TELECOMMUNICATION LINE

FIG. 2

3. COMMUNICATION UNIT

7. SENSOR

8. A/D CONVERTER

9. DATA

10. BUFFER

11. DATA TRANSMITTER-RECEIVER

12. CONTROLLER

13. POWER SOURCE

FIG. 3

2. INTERFACE CIRCUIT

4. CENTER SYSTEM

14. DATA TRANSMITTER-RECEIVER

15. BUFFER

16. CENTRAL CONTROL UNIT

17. MEMORY

18. TIMER

19. MODEM